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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/768,438	01/29/2004	Naoyuki Enjoji	TOW-063	8750

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EXAMINER	
CREPEAU, JONATHAN	
ART UNIT	**PAPER NUMBER**
1745	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/768,438	ENJOJI ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 May 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-9* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 May 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1-3 and 5-9. The allowability of the claims is withdrawn in view of the newly discovered reference to Choi. Accordingly, the claims are subject to new grounds of rejection under 35 USC 103 herein, and this action is non-final.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choi (U.S. Patent 6,689,502) in view of WO 02/080299 (English equivalent: Fujii et al, U.S. Patent 7,081,317).

Choi teaches a fuel cell comprising a plurality of power generation units (121, 131) arranged on a same plane (see Fig. 9). The power generation units are connected in series (see col. 5, line 25). A pair of metal diffusion layers (150, 160) are provided on opposite sides of the power generation units. Insulating structures (gaskets 301, 302) are provided in the diffusion layer between the power generation units.

The reference does not expressly teach that the gaskets are made of resin, as recited in claim 1.

However, the artisan would be motivated to use a resin in the gaskets of Choi. Resins in general are widely known for use in gaskets for their sealing and electrically insulating properties. As such, it would be well within the skill of the art to use a resin in the gaskets of Choi.

Choi also does not expressly teach a plurality of fuel cells as recited in claims 1 and 5, or "fuel cell units" formed by stacking a plurality of fuel cells as recited in claim 5. The reference further does not expressly teach a switching mechanism for selectively connecting the fuel cells or fuel cell units in parallel to a load circuit.

In Figure 10, Fujii et al. '317 teaches a plurality of fuel cells (X, Y), each comprising a plurality of power generation units (50) arranged on a same plane and connected in series. A switching mechanism selectively connects the fuel cells in a series or parallel configuration with a load (see column 10, line 47 et seq.).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the disclosure of Fujii et al. would motivated the artisan to interconnect a plurality of fuel cells/fuel cell units of Choi in a parallel switching configuration. In column 12, line 45, Fujii et al. teaches the following:

> In this example, series-parallel switching was performed for two cell blocks; however, the number of cell blocks for which the switching is performed is not limited to two, and the switching may be performed for three or more plural cell blocks. In addition, although the cell blocks were formed on a same substrate in this example, a similar result can be achieved when they are formed on different substrates.

The artisan would motivated to interconnect a plurality of fuel cells/fuel cell units of Choi in a parallel switching configuration in order to increase flexibility of the electrical output of the apparatus of Choi. Further, Fujii et al. contemplate configurations comprising a plurality of fuel cells, and as such, the artisan would be sufficiently skilled to stack the fuel cells as recited in claim 5.

Regarding the limitations in claims 6 and 7 directed to valves and pumps, it would be well within the skill of the art to include such devices in the reactant supply systems of Choi. In particular, it would be advantageous to be able to precisely control reactant flow to a specific fuel cell depending on whether that fuel cell was connected in series or parallel. Accordingly, the use of valves and pumps operable with the switching system is considered to be obvious to the skilled artisan.

Further, it would be obvious to include a coolant flow configuration for supplying coolant in parallel to the fuel cells, as recited in claims 8 and 9. Fujii et al. recognize the need for a coolant system in column 1, line 60. It would therefore be obvious to provide a coolant system in the apparatus of Choi in order to efficiently remove heat from the fuel cells.

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choi in view of WO '299 as applied to claims 1 and 5-9 above, and further in view of Adams et al (U.S. Patent 7,038,424).

Neither Choi nor Fujii et al. expressly teaches that each of the fuel cells is connected to a variable resistor as recited in claim 2.

Adams et al. is directed to a method and apparatus for rejuvenating fuel cells. In Figure 2B, the reference teaches a plurality of fuel cells (125, 127), each connected to a variable resistor (VR1, VRN).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the variable resistors of Adams et al. in the system of Choi. As disclosed in the abstract of Adams et al., the variable resistors are used to control the current in the fuel cell, and thereby electrocatalyst poisons on the anode and cathode can be removed. Accordingly, the artisan would be motivated to use the variable resistors of Adams et al. in the system of Choi.

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choi in view of WO '299 as applied to claims 1 and 5-9 above, and further in view of Fuglevand (U.S. Patent 6,497,974).

Neither Choi nor Fujii et al. expressly teaches that the switching mechanism is capable of connecting different numbers of the power generation units in series, as recited in claim 3.

In Figure 4, Fuglevand teaches a system comprising a plurality of power generation units (12a-12i) that are connected to switching circuitry and are capable of serial or parallel connection.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to provide the capability in the system of Choi of selectively connecting or disconnecting individual power generation units in series. In column 11, line 12, Fuglevand teaches that "in this embodiment of the invention, the switching circuitry 62 couples a desired number of modules together in series (and/or in parallel) depending on the load requirements." As such, an artisan would be motivated to provide the capability in the system of Choi of selectively connecting or disconnecting individual power generation units in series, in order to provide greater flexibility in meeting load requirements.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the

organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JC

Jonathan Crepeau
Primary Examiner
Art Unit 1745
July 24, 2007